Self-assembly and stickiness of alkylcatechols on surfaces: an STM and theoretical study

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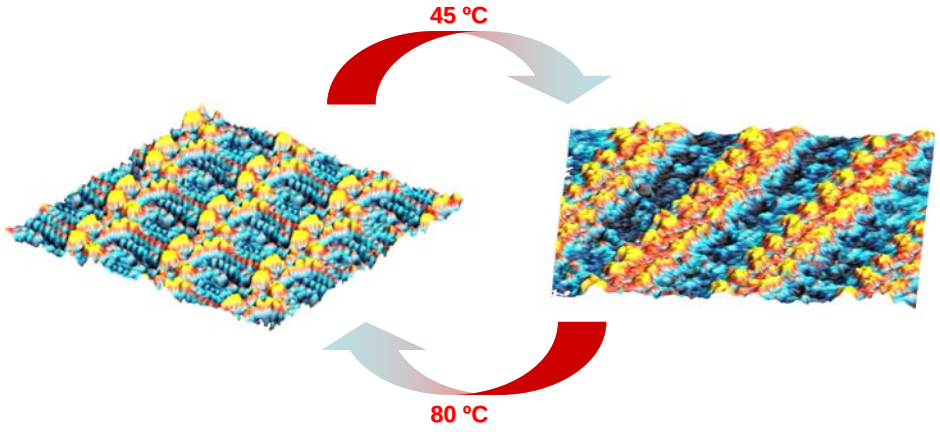
The ability of catechol derivatives to interact with surfaces, such as that observed for mussels and ancient lacquers, has been exploited by many scientists worldwide to develop new functional adhesives and protective coating films. However, despite numerous applied studies have been so far successfully developed, understanding the basic behaviour of catechols on surfaces still remains a challenge. In this work, three alkylcatechols have been successfully studied by STM at the liquid-solid interface (nonanoic acid-HOPG). Experimental results having molecular resolution combined with molecular dynamics simulations have shown the large tendency of these molecular systems to organize on surfaces through a strong adhesion mechanism, of energetic (interactions on the surface) but mainly thermodynamic (solvent effects) origin. In addition, a thermally-driven switchable behaviour has been observed for one of these systems. These results open new insight into the behaviour of catechol derivatives on surfaces and therefore on the applications that can be derived by mimicking them.



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